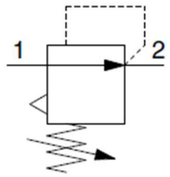
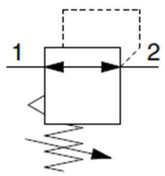
ORIGINAL INSTRUCTIONS

Instruction Manual
Regulator/ Regulator with Backflow Function
Series *AR□-B / AR□K-B*



Regulator



Regulator with Backflow Function

The intended use of this product is to regulate the air pressure in the pneumatic circuit

1 Safety Instructions

Be sure to read the “Handling Precautions for SMC Products”, “Product Catalogue” and the “Operation Manual” on the SMC website before handling this product:
https://www.smcworld.com/pl/en-jp https://www.smc.eu/en-eu/safety-instructions

These safety instructions are intended to prevent hazardous situations and/or equipment damage. These instructions indicate the level of potential hazard with the labels of “**Caution**,” “**Warning**” or “**Danger**.” They are all important notes for safety and must be followed in addition to International Standards (ISO/IEC), and other safety regulations.

⚠ **Danger**	Danger indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
⚠ **Warning**	Warning indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠ **Caution**	Caution indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.

⚠ Warning

- **Always ensure compliance with relevant safety laws and standards.**
- All work must be carried out in a safe manner by a qualified person in compliance with applicable national regulations.

2 Specifications

2.1 Standard Specifications

Series	AR□□-B
Construction	Relieving type
Fluid	Air
Ambient and fluid temperature	-5 to +60 °C (No freezing) Note 1)
Proof pressure	1.5 MPa
Max. operating pressure	1.0 MPa
Set pressure range	0.05 to 0.85 MPa
Pressure gauge port size	1/8 Note 2)
Lubrication	Not required (Refer to 3.4)
Filtration	5 µm filtration or smaller
Weight	See Table 2
Port size	See Table 2
Shock resistance Note 3	300 m/s^2 (nominal pulse 6 ms)
Vibration resistance Note 4	50 m/s^2

Table 1.

Note 1) -5 to +50 °C for the products with the digital pressure switch.

2 Specification - Continued

Note 2) Pressure gauge connection threads are not available for F.R.L. unit with a square embedded type pressure gauge or with a digital pressure switch.
Note 3) two axes (horizontal and vertical) and two directions were tested 3 times and no malfunction of the regulator occurred (pulse shape: sine shape), test sample mounted with bracket.
Note 4) No malfunction occurred in a sweep cycle test between 10 to 150 Hz at vibration sweep 0.35mm. The test was performed in the two axes and two directions, 7 min per cycle (20 cycles), 20 times.

2.2 Weight and Port Size

Model	Weight [kg]	Port size
AR20-B	0.16	1/8, 1/4
AR25-B	0.21	1/4, 3/8
AR30-B	0.29	1/4, 3/8
AR40-B	0.44	1/4, 3/8, 1/2
AR40-06-B	0.47	3/4
AR50-B	1.17	3/4, 1
AR60-B	1.22	1

Table 2.

2.3 Selection

⚠ Warning

- Residual pressure disposal (outlet pressure removal) is not possible for the AR□-B even though the inlet pressure is exhausted. When the residual pressure disposal is required, use the regulator with a backflow function (AR□K-B)
- Set pressure of outlet pressure shall be 85% or less of inlet pressure. Pressure over 85% makes operation susceptible to flow and inlet pressure and may lead to unstable operation.

$$P_2 < P_1 \times 0.85$$

- Inlet pressure to the regulator should be at least 0.05 MPa greater than the set pressure. Any lower may lead to unstable operation. (Only AR□K-B)

$$P_1 \geq P_2 + 0.05 \text{ MPa}$$

⚠ Warning

Special products (-X) might have specifications different from those shown in this section. Contact SMC for specific drawings.

3 Installation

3.1 Installation

⚠ Warning

- Do not install the product unless the safety instructions have been read and understood.

3.2 Environment

⚠ Warning

- Do not use in an environment where corrosive gases, chemicals, salt water or steam are present.
- Do not use in an explosive atmosphere.
- Do not expose to direct sunlight. Use a suitable protective cover.
- Do not install in a location subject to vibration or impact exceeding the product’s specifications.
- Do not mount in a location exposed to radiant heat that would result in temperatures exceeding the product’s specifications.

3.3 Piping

⚠ Caution

- Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil, and other debris from inside the pipe.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1 thread exposed on the end of the pipe/fitting.
- Tighten fittings to the specified tightening torque.

3.4 Lubrication

⚠ Caution

- SMC products have been lubricated for life at manufacture, and do not require lubrication in service.
- If a lubricant is used in the system, refer to catalogue for details.

4 Settings

- Turning the regulator knob in the clockwise direction will increase the set pressure.
- Turning the regulator knob in the anti-clockwise direction will decrease the set pressure.
- Set the regulator while verifying the displayed values of the inlet and outlet pressure gauges. Turning the regulator knob excessively can cause damage to the internal parts.
- Do not use tools on the pressure regulator knob as this may cause damage. It must be operated manually.

⚠ Caution

- Be sure to unlock the knob before adjusting the pressure and lock it after setting the pressure. Failure to follow this procedure can cause damage to the knob and the outlet pressure may fluctuate.
  - Pull the pressure regulator knob to unlock. (You can visually verify this with the “orange mark” that appears in the gap)
  - Push the pressure regulator knob to lock. When the knob is not easily locked, turn it left and right a little and then push it (when the knob is locked, the “orange mark”, i.e., the gap will disappear).
- Pulsation will be generated when the difference between the inlet and the outlet pressure is large. In this case, reduce the pressure difference between the inlet and the outlet. Please consult with SMC if the pulsation problem is not resolved.

5 How to Order

Refer to drawings or catalogue for ‘How to Order’.

6 Outline Dimensions

Refer to drawings or catalogue for outline dimensions.

7 Maintenance

7.1 General maintenance

⚠ Caution

- Not following proper maintenance procedures could cause the product to malfunction and lead to equipment damage.
- If handled improperly, compressed air can be dangerous.
- Maintenance of pneumatic systems should be performed only by qualified personnel.
- Before performing maintenance, turn off the power supply and be sure to cut off the supply pressure. Confirm that the air is released to atmosphere.
- After installation and maintenance, apply operating pressure and power to the equipment, and perform appropriate functional and leakage tests to ensure the equipment is installed correctly.
- If any electrical connections are disturbed during maintenance, ensure they are reconnected correctly and that safety checks are carried out as required to maintain continued compliance with applicable national regulations.
- Do not make any modification to the product.
- Do not disassemble the product, unless required by installation or maintenance instructions.
- Periodical adjustment of manual regulator might be required.

⚠ Warning

When using the regulator between a solenoid valve and an actuator, check the pressure gauge periodically. Sudden pressure fluctuations may shorten the durability of the pressure gauge. A digital pressure gauge is recommended for such situation or as deemed necessary. (Only AR· K-B)

8 Limitations of Use

8.1 Limited warranty and disclaimer/compliance requirements

Refer to Handling Precautions for SMC Products.

⚠ Caution

- The system designer should determine the effect of the possible failure states on the system.
- Regulator is not to be used as a pressure relief valve.
- Apply additional measures to relieve large volumes of pressurised air.
- In the event of a regulator failure the secondary pressure may rise to the inlet pressure. Additional measure shall be made to safely relieve excess pressure downstream of the regulator.

9 Product Disposal

This product shall not be disposed of as municipal waste. Check your local regulations and guidelines to dispose of this product correctly, in order to reduce the impact on human health and the environment.

10 Support / Importer / Manufacturer

Support: Please contact your distributor or importer in the country of purchase if you need assistance.
Importer: Address of importer in the country of purchase is listed at https://www.smc.eu/en-eu/worldwide-addresses

Manufacturer:

SMC Corporation

URL: https://www.smcworld.com (Global) https://www.smc.eu (Europe)
SMC Corporation, 1-5-5, Kyobashi, Chuo-ku, Tokyo 104-0031, Japan
Specifications are subject to change without prior notice from the manufacturer.
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